Amendments to the Specification:

Please replace paragraph [0013] with the following amended paragraph:

[0013] Another object of the invention is to provide a flow cell design that provides the flexibility to increase the number of sample channels without ~~comprising~~ compromising the ability of the sensors within the flow cell to make accurate measurements.

Please replace [0034] with the following amended paragraph:

[0034] Referring now to the drawings, where similar parts are numbered the same, Figure 1 depicts a simple embodiment of the invention where the flow cell **10** comprises a substrate **20** having at least one sample channel **30** and at least one optical fiber channel holder **35** disposed therein. For the purpose of this application and the appended claims, an optical fiber channel holder is a holder that is capable of achieving precision alignment and consistent tension on the optical fiber. At least one optical fiber **40** is disposed within each optical fiber channel holder **35**. The optical fiber **40** has at least one grating **50** disposed therein. The optical fiber channel holder **35** is designed to come into contact with the sample channel **30** at the points along the optical fiber where each optical fiber grating **50** is located. These points define a sensing area **55**. At least one sample port **60** is positioned in an operable relationship to at least one sample channel **30** to permit introduction of a sample into the sample channel. A sample outlet **75** is in fluid connection with the sample channel **30** such that the sample is removed from the flow cell through the sample outlet **75**. ~~Although two sample ports are depicted, it is understood that there need only be one sample port.~~ When the flow cell has ~~one sample port,~~ no sample outlet, the sample is introduced into and exits from the flow cell through the ~~same~~ sample port 60. The sample port **60** is positioned in an operable relationship to the sample channel **30** such that the sample may easily flow into the sample channel. **In** one embodiment of the invention, where the flow cell comprises more than one sample

port, at least one sample port is plugged with a gas permeable material that allows air to escape as a sample is introduced into another sample port. Alternatively, a pump is attached to at least one sample port to serve as a means for either drawing or pushing the sample through the flow cell. Lastly, the sample port may serve as an exit port for the sample after it flows through the flow cell. Multiple sample ports may be employed when the user desires to introduce multiple samples into the flow cell. Alternatively, a pipette tip is formed on the sample port for drawing fluid samples into the sample channel and through the substrate. This is especially desirable when a microtiter plate arrangement is employed.

Please replace paragraph [0040] with the following amended paragraph:

[0040] Figure 3 depicts an alternative embodiment of the flow cell **10** comprised of three mating pieces. In this embodiment, there is an upper section **100** containing at least one sample channel (not shown) and at least one sample port **60**. This portion is counter-sunk to permit critical alignment of the optical fiber channel holder **35** with the sample channel **30**. In the middle section **110**, there is the optical fiber channel holder **35** having the optical fiber **40** disposed therein. The optical fiber channel holder **35** is configured to allow a space defining a sensing area **115** where the grating portion of the optical fiber **40** is located. The optical fiber channel holder is designed such that the sensing area and flow cell walls are close to the fiber for diffusion purposes. The lower section **120** of the flow cell serves as a support or base for the assembly. As with the upper portion, the lower section **120** is also counter-sunk to permit critical alignment of the optical fiber channel holder **35** with the sample channel **30**. The flow cell assembly is joined and held together by a fastener. Any fastener known to those of skill in the art may be used. Examples of such fasteners include but are not limited to: screws; nuts and bolts; male-female connectors that are fabricated as part of the substrate; rivets; welds; adhesives; straps; crimp connectors such as bent wire; bands fabricated from rubber, metal, plastic; and clamps such as C-clamps. The use of multiple mating pieces allows the user to

modify the flow cell or reconfigure it. For example, an upper section containing a single sample channel having one sample port may be substituted with an upper section having multiple sample channels having either one or multiple sample ports. If desired, the upper section may also contain a sample outlet or multiple sample outlets so the sample is removed from the flow cell through an outlet other than the sample port. Alternatively, the middle section may be exchanged to match the number of sample channels of the upper section or may provide a single sensing area where many samples converge. When the need arises, one may incorporate various sealing means, such as gaskets, to prevent leakage. Because of the versatility afforded by having a piece-like structure, a flow cell kit is provided that allows the user to design custom flow cells depending on the application. The kit configuration makes the flow cell easy to clean. The ability to disassemble the flow cell easily allows for the user to apply various coatings to the cell that can be removed without causing damage to the flow cell. A flow cell comprised of mating pieces provides a significant advantage over the prior art flow cells because it is easy to clean; can be easily converted for a particular application; provides consistent manufacturing and test results; and provides the flexibility to increase the number of sample channels without compromising the measurements made in the sensing area.

Please replace paragraph [0041] with the following amended paragraph:

[0041] Figures 4 and 5 show alternative embodiments of the invention where the number of sample ports and sample channels are varied and the sample port serves as both an inlet and an outlet for the sample. In these configurations, the sample channel **30** terminates with a sample reservoir **37**. This permits the sample to be contained within the flow cell after it has passed through the sensing area **55**. Figure 4 depicts an embodiment where there is one sample port **60** and a plurality of sample channels **30**. In this arrangement, the sample enters and exits the flow cell **10** through the sample port **60**. The optical fiber **40** is disposed within the optical fiber channel holder **35**. Sample measurements are made in the sensing area **55** where the optical fiber grating **50** is in

close proximity to the sample channel **30**. Figure 5 shows an alternative embodiment that allows samples to be mixed within the flow cell **10**. In this embodiment, a plurality of sample ports **60** are provided but only one sample channel **30**, terminating with a sample reservoir **37**, is provided. The optical fiber **40** is disposed within the optical fiber channel holder **35**. A plurality of samples are introduced through the sample ports **60**, mixed in the sample channel **30**, and detected in the sensing area **55** of the flow cell where the grating **50** is in close proximity to the sample channel. The mixed sample is removed from the flow cell through the sample ports **60** upon completion of the data collection process. Both figures depict a preferred embodiment where an optical fiber connector **45** is attached to an end of the optical fiber **40**.

Please replace paragraph [0044] with the following amended paragraph:

[0044] Figures 11A and 11B depict how a flow cell array **125** is assembled by stacking various flow cell assemblies **10** together. Each flow cell **10** has a means for interlocking with another flow cell (not shown). In a most preferred embodiment of the invention, the flow cell has at least one sample outlet **75**, at least one sample channel ~~**30**~~ (not shown), and 2, 8, 96 384, or 1536 sample ports. ~~In addition, each~~ Each flow cell has at least one sample port **60**. Also depicted is a preferred embodiment where each optical fiber (not shown) terminates with an optical fiber connector **45**. When there are multiple sample channels, each channel is spaced apart a distance of less than or about 9mm. This spacing makes the flow cell compatible with micro titer plates which are the sample plates used in life sciences research. The tip volumes and spacing between the tips are designed into the flow cell for microtiter interface. In addition, when the flow cell comprises mating pieces, quadrant sampling can be used to interface with high capacity plates such as 384 and 1536 micro titer plates (Figures 11A and 11B).